World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:10, No:03, 2016

Influence of Specimen Geometry (10*10*40), (12*12*60) and (5*20*120), on Determination of Toughness of Concrete Measurement of Critical Stress Intensity Factor: A Comparative Study

Authors : M. Benzerara, B. Redjel, B. Kebaili

Abstract : The cracking of the concrete is a more crucial problem with the development of the complex structures related to technological progress. The projections in the knowledge of the breaking process make it possible today for better prevention of the risk of the fracture. The breaking strength brutal of a quasi-fragile material like the concrete called Toughness is measured by a breaking value of the factor of the intensity of the constraints K1C for which the crack is propagated, it is an intrinsic property of the material. Many studies reported in the literature treating of the concrete were carried out on specimens which are in fact inadequate compared to the intrinsic characteristic to identify. We started from this established fact, in order to compare the evolution of the parameter of toughness K1C measured by calling upon ordinary concrete specimens of three prismatic geometries different (10*10*40) Cm3, (12*12*60) Cm3 & (5*20*120) Cm3 containing from the side notches various depths simulating of the cracks was set up.The notches are carried out using triangular pyramidal plates into manufactured out of sheet coated placed at the center of the specimens at the time of the casting, then withdrawn to leave the trace of a crack. The tests are carried out in 3 points bending test in mode 1 of fracture, by using the techniques of mechanical fracture. The evolution of the parameter of toughness K1C measured with the three geometries specimens gives almost the same results. They are acceptable and return in the beach of the results determined by various researchers (toughness of the ordinary concrete turns to the turn of the 1 MPa √m). These results inform us about the presence of an economy on the level of the geometry specimen (5*20*120) Cm3, therefore, to use plates specimens later if one wants to master the toughness of this material complexes, astonishing but always essential that is the concrete.

Keywords : concrete, fissure, specimen, toughness
Conference Title : ICFMPCA 2016 : International Conference on Fracture Mechanics, Polymers, Composites and Adhesives
Conference Location : Madrid, Spain
Conference Dates : March 24-25, 2016